

# **ATSDR/DRO Activity Form**

Preparer's First Name: Lora		Preparer's Last Name: Werner		Preparer's Affiliation: DRO
Site Name: Dimock Residential Groundwater Site			City: Dimock	
State/Tribe: PA	Cost Recovery #: 3ATA	EPA ID:	Non-site-specific: <input type="checkbox"/>	
Requester's Name: Dennis Carney, Branch Chief			Phone Number: 215-814-3241	
<b>Requester Category</b> <input type="checkbox"/> EPA <input checked="" type="checkbox"/> Removal				

<b>Question or Request</b> (full description)	<b>Date of Request</b> (mm/dd/yyyy): 3/12/2012
EPA R3 removal asked ATSDR R3 what concentration of lithium in drinking water would represent an acute public health concern. In addition, ATSDR R3 is interested in establishing whether lithium in the 200-500 ug/L range would represent a public health concern.	

<b>Activity</b> (Select all that apply)		
<input type="checkbox"/> Chemical Exposure <input type="checkbox"/> Community Involvement <input checked="" type="checkbox"/> Emergency Response <input type="checkbox"/> Health Assessment <input type="checkbox"/> Health Consultation	<input type="checkbox"/> Health Education <small>(Public or Health Care Provider)</small> <input type="checkbox"/> Outreach Activity <input type="checkbox"/> Public Meeting <input checked="" type="checkbox"/> Removal <input type="checkbox"/> Referrals (PEHSU, ACMT)	<input type="checkbox"/> Site Visit <input checked="" type="checkbox"/> Technical Assistance <input type="checkbox"/> Other (specify)

<b>Special Initiative</b> (Select all that apply)		
<input type="checkbox"/> Brownfields <input type="checkbox"/> CARE Pilot <input type="checkbox"/> Day care <input type="checkbox"/> Exercises	<input type="checkbox"/> Land Reuse Sites <input type="checkbox"/> Mercury response <input type="checkbox"/> Non-site related <small>(HIA, asbestos, workgroups, etc)</small> <input type="checkbox"/> School Siting <input type="checkbox"/> Success Story	<input type="checkbox"/> Toxicological data/PDA <input type="checkbox"/> Training <input type="checkbox"/> Tribal Activities <input type="checkbox"/> Other (specify)

<b>ATSDR Response</b> (Detailed description of response)	<b>Date of Response</b> (mm/dd/yyyy): 3/23/2012
EPA R3 removal asked ATSDR R3 what concentration of lithium in drinking water would represent an acute public health concern. In addition, ATSDR R3 is interested in establishing whether lithium in the 200-500 microgram per liter or parts per billion (ug/L or ppb) range would represent a chronic public health concern. ATSDR R3 referred this request to ATSDR Emergency Response. ATSDR ER and the National Center for Environmental Health (NCEH) reviewed information from ATSDR, EPA, FDA, and other available literature on lithium toxicity.	
<b>RESPONSE TO QUESTION 1: What concentration of lithium in water would pose an acute human health threat?</b>  Based on the literature reviewed, lithium concentrations in drinking water below 1,500 ug/L would likely not result in adverse acute health effects in children or adults. Based on clinical experience with acute toxicity, 1,500 ug/L represents a conservative level of concern for acute toxicity. There are a few epidemiologic studies associating varying levels of lithium in drinking water with	

Thyroid impairments have been observed in individuals receiving lithium therapy, and possible thyroid effects from lithium in drinking water have been reported. Further, there is sufficient evidence available to conclude that therapeutic use of lithium causes developmental effects in offspring when maternal serum lithium concentrations are within the therapeutic range.

ATSDR cannot determine if chronic consumption to 200-500 ug/L of lithium in drinking water represents a public health concern. Note, these levels are unlikely to affect individuals already on lithium therapy as they would be very small (about 1,000 times less) compared to therapeutic doses; furthermore, these individuals should be having lithium levels measured periodically and doses adjusted accordingly.

A Lowest Observable Adverse Effect Level (LOAEL) has not been identified for lithium ingestion. In 2008, EPA developed a conservative provisional reference dose (RfD) for lithium ingestion of 2 ug/kg/day. In the absence of a LOAEL for lithium ingestion, EPA assigned the LOAEL to 2.1 mg/kg/day, which was estimated as the lowest value at which therapeutic effects were recognized, and then applied multiple uncertainty factors. Adverse effects in multiple organ systems have been noted at all therapeutic levels but are generally accepted to be related to increasing therapeutic serum levels. EPA used an uncertainty factor (UF) of 1,000 in this provisional RfD derivation (10 for LOAEL, 10 for human variability, and 10 for database uncertainty). The additional UF of 10 for database sufficiency is generally not used in ATSDR's derivations of health guidance values. Without the extra uncertainty factor of 10, a provisional guide for chronic exposures for a child would be approximately 200 ug/L of lithium in drinking water (i.e., 20 ug/kg/day X 10 kg child / 1 L/day) or 700 ug/L of lithium in drinking water for an adult (i.e., 20 ug/kg/day X 70 kg / 2 L/day). Using EPA's provisional RfD, screening value concentrations in drinking water can be calculated as 70 ug/L (for adults weighing 70 kg drinking 2 L/day), 20 ug/L for a 10 kg infant/child drinking 1 L/day, and 32 ug/L (for a 16 kg child drinking 1 L/day). It is very unlikely that levels of 200-500 ug/L of drinking water would be associated with acute toxicity. There are a few epidemiologic studies associating varying levels of lithium in drinking water with behavioral effects and effects on thyroid functions. There is a wealth of literature on therapeutic use of lithium and adverse effects over time at doses that are much higher than these environmental exposures. Further study would need to be done to fully understand the effect of chronic lithium drinking water exposure at environmental exposures less than therapeutic exposures.

DRO Rep: *Dir DRO*

Regional Rep: Lora Werner

DRO Concurrence: *U*

DRO Rep Signature:

Regional Rep Signature: